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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/690,580	10/17/2000	Vladislav Vashchenko	NSC1-H1500	3449

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EXAMINER

FARAHANI, DANA

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 04/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.	Applicant(s)	
09/690,580	VASHCHENKO ET AL.	
Examiner	Art Unit	
Dana Farahani	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on 01 February 2002.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4) Claim(s) 1-6 and 9-22 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) 14-22 is/are allowed.

6) Claim(s) 1-6 and 9-13 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:  
1. Certified copies of the priority documents have been received.  
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 9, 18, and 19 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 9 “a base extender formed on the first semiconductor material on the base region, the base extender being formed from a second semiconductor material that is different form the first semiconductor material” was not in the specification as originally filed.

Regarding claim 18, “further comprising a first trace formed on the layer dielectric material” was not in the specification as originally filed.

Regarding claim 19, “a second trace formed on the second layer of dielectric material” was not in the specification as originally filed.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's Admitted Prior Art (AAPA).

AAPA discloses in figure 1 an electrostatic discharge device formed in a first semiconductor material, the device comprising a collector region 14 of a first conductivity type formed in the first semiconductor material; a base region 16 of a second conductivity type formed in the collector region; an emitter 18 formed on the first semiconductor material on the base region, the emitter having a top surface, a base extender 26 formed on the first semiconductor material on the base region, the base extender being formed from a second semiconductor material that is different from the first semiconductor material; a layer 32 of dielectric material formed on the first semiconductor material on the base region; a ohmic emitter contact 28 formed through the dielectric layer, the emitter contact having a top surface and contacting the top surface of the emitter; and an ohmic base contact 24 formed through the layer of dielectric material, the base contact having a top surface, contacting the top surface of the base extender, and being electrically connected to the base region, the ohmic base contact being formed from a third semiconductor material different from the second semiconductor material.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey et al., hereinafter Lowrey (U.S. 5581104), previously cited in view of Delage et al., hereinafter Delage (U.S. 6031255), previously cited.

Lowrey discloses a bipolar transistor-based ESD protection structure comprising an N-type semiconductor substrate, figure 8, a bipolar transistor disposed in and on the semiconductor substrate, the bipolar transistor having a base region, shown as an N region, a collector region, shown as a P+ region connected to an input, and a polysilicon emitter P+ connected to Vcc. However Lowrey does not disclose a heat sink. Delage, in figure 9, discloses a heat sink region 101, integrated with the metal layer 94, adjacent to the emitter 40 and above the semiconductor substrate 10, in order to reduce the heat generated during an ESD event. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the heat sink Delage discloses in the Lowrey invention in order to reduce the heat generated.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey and Delage as applied to claim 1, above, and further in view of Leuschner (U.S. 4724471). Delage, as applied to Lowrey, does not disclose the heat sink is formed of

polysilicon. However, it is well known in the art that polysilicon layers are commonly used as heat sinks (see for example Leuschner, column 8, lines 16-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the heat sink Delage discloses from polysilicon in order to make a good heat sink.

8. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey and Delage as applied to claim 1, above, and further in view of Akram (U.S. 6075288).

Regarding claims 3 and 4, Delage, as applied to Lowrey, does not disclose the heat sink region formed of metal layers. Akram describes a floating heat sink formed of copper, aluminum, molybdenum, titanium, and alloys of these materials. (see column 3, lines 40-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the heat sink Delage discloses from the material Akram describes in order to form a heat sink with a high thermal conductivity.

Regarding claim 5, Akram, as applied to claims 3 and 4 above, does not disclose the heat sink is within 2 microns of the polysilicon emitter. However, it would have been an obvious matter of design choice to those skilled in the art to dispose the heat sink region within 2 microns of the polysilicon emitter since heat transfer by conduction is more efficient.

#### ***Allowable Subject Matter***

9. Claims 14-22 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: The primary reason for the indication of the allowability of claims 14-22 is the inclusion therein, in combination as currently claimed, of the limitation of the heat sink contact formed through the dielectric layer; contacting the top surface of the base region. This limitation is found in claims 14-22, and neither disclosed nor thought by the prior art of record, alone or in combination.

#### ***Response to Arguments***

11. Applicant's arguments regarding claims 1-6 filed January 16, 2002 have been considered but they are not persuasive.

Applicant argues that Lowrey does not teach the substrate is formed of polysilicon and as a result one skilled in the art would not understand that the substrate was polysilicon. This is not persuasive since it was known in the art that both monocrystal and polysilicon substrates are used in the art (see for example Gaul et al. (U.S. 6,114,768) column 4, lines 8-15).

#### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani  
March 27, 2002



OLIK CHAUDHURI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800